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Description

The present invention relates to game machines, and more particularly to game machines displaying a multiple series of symbols.

Slot machines are well known as game machines in which players can play a game by inserting coins or tokens (hereinafter referred to as coins) prior to starting the game. A slot machine is provided with, for example, three reels, each of which has a plurality of symbols arranged on its outer periphery in a predetermined sequence. Whether and what a prize should be awarded is determined depending on a combination of symbols displayed within respective display windows when the reels stop after rotating. If the resulted symbol combination coincides with one of a plurality of predetermined winning symbol combinations, the game is judged as a hit game, and a predetermined number of coins decided by the rank of the winning are paid out.

Of these slot machines, there are also such slot machines in which the player can rotate the reel once again after all reels have stopped if, for example, any reel displays a specific symbol at the end of the first reel rotation. This provides the slot machines with an additional function for enabling an additional game, and would contribute to elongate the interest span.

But in the above described additional game, since the player is merely allowed to rotate some of the same reels as in the first or regular game, the variety of symbol combinations obtained in the additional games is just the same as in the regular games. Therefore, the conventional additional game function is insufficient to increase the amusement and does not so remarkably improve on the monotony of the slot machines.

GB-A-2165074 discloses a slot machine comprising three side-by-side reels arranged coaxially and in which portions of two of the reels extend inside the third reel and can be viewed through the third reel. These inner portions carry symbols and a prize is awarded if the symbols on the inner portions correspond to the symbol in the third reel which they underlie. The inner portions can be independently driven.

An object of the present invention is to provide a game machine which can give multiplicity to the symbols or can display the symbols in a special manner so as to provide a new amusement for the player.

According to the present invention there is provided a game machine comprising:

a first and a second series of symbols, each series comprising a plurality of symbols;

first display control means for displaying the first series of symbols in motion for a period of time and thereafter at least one symbol of the first series stationary; characterized by

second display control means for displaying

the second series of symbols in motion in place of a symbol of the first symbol series and thereafter displaying a symbol of the second series stationary to replace that symbol of the first series.

5 The present invention can be adapted to a game machine comprising:

a rotational inner reel having a first plurality of symbols arranged circumferentially around its outer periphery;

10 an outer reel rotatable around said inner reel and having a second plurality of symbols and at least one transparent portion arranged circumferentially around its outer periphery, said transparent portion being at least as large as a symbol; and

15 reel control means for controlling the start and stop of the rotation of said inner and outer reels independently of each other and for controlling the outer reel to stop with its transparent portion overlying a symbol on the inner reel.

20 The invention can be adapted to a game machine in which at least a reel having symbols on its outer periphery is adopted, the reel is formed as a double-reel comprising an inner and an outer reels, wherein the outer reel has a transparent portion which is about as large as a symbol or more, and through the transparent portion at least one of symbols on the inner reel can be viewed.

25 The present invention is applicable to video-type slot machine where symbols are displayed on a CRT screen of a graphic display unit.

30 In the game machine according to the present invention, it is possible to play an additional game if the specific symbol is displayed in the display window at the stop of the movement of the first series of symbols, and in the additional game, the moving symbols of the second series are displayed and thereafter one of the second series of symbols is stopped in the position where the specific symbol is displayed. As the first series of symbols are fixed during the additional game, and both symbols adjacent to the specific symbol are unchanged, such a symbol display is not only visually novel, but also makes it possible to display two series of symbols in a column, so that the number of symbol combination patterns will be easily increased and also the amusement of the game will be improved without enlarging the displaying space.

35 The invention will be further described by way of non-limitative example with reference to the accompanying drawings, in which:-

40 50 Figure 1 is a perspective view of an outer appearance of a slot machine embodying the present invention;

55 Figure 2 is a perspective view of a double-reel assembly according to an embodiment of the invention;

Figure 3 is a sectional view of the double-reel assembly of Fig. 2;

Figure 4 is a block diagram showing an example

of a controlling circuit for the slot machine; Figures 5 and 6 show a flow chart illustrating a processing of the slot machine; Figure 7 shows another embodiment of the present invention; and Figure 8 shows a further embodiment of the present invention.

Referring to Fig. 1 showing an outer appearance of a slot machine embodying the present invention, the slot machine 1 is provided at its front panel 2 with three display windows 3 to 5, inside which the first, second and third reels 6 to 8 are disposed. Each reel has a series of symbols disposed on its outer periphery at regular intervals and is rotatable to display moving symbols within the corresponding display window 3, 4 or 5. When the reels 3 to 5 stop, three symbols can be observed at once through each window.

There are five winning lines across the windows 3 to 5, namely, three horizontal lines and two diagonal lines. Which of the winning lines are effective is dependent on the number of coins inserted prior to the start of a game. For example, when a single coin is inserted, only the middle horizontal line becomes effective, and when two coins are inserted, the three horizontal lines become effective in judging a win. When three coins are inserted, all the five lines including the two diagonal lines become effective. For simplicity, however, the following description will be given for the case in which the middle horizontal line alone is effective.

Upon actuating a start lever 12 after the insertion of a coin through a coin slot 10, the first to third reels 6 to 8 simultaneously start rotating. The rotation of each reel is caused to stop in response to the depression of a stop button 13, 14 or 15 which is provided for each reel. Whether a game results in a hit game, that is, the winning of a prize, or a lost game is determined depending on a combination of symbols stops on the winning line. If the combination of symbols on the winning line corresponds to one of the predetermined hit combinations, a predetermined number of coins are paid out according to the rank of the obtained hit combination. Designated by 16 is an additional game start button, which can be actuated to start an additional game only when the result of the first game, that is, a regular game enable the player to play such an additional game. As to the additional game, it will be described later in detail.

Referring now to Figs. 2 and 3 showing the detail of the first reel 6, the first reel 6 is an outer reel of a double reel assembly 20, where an inner reel 17 is coaxially disposed inside the outer reel 6. The reel 6 is directly connected to a drive shaft 18a of a stepping motor 18, while the inner reel 17 is directly connected to a drive shaft 19a of a stepping motor 19. The reels are driven to rotate by the respective stepping motors 18 and 19, independently from each other. Each of

the reels 6 and 17 is formed at its one edge with a light-shielding lug 21, 22, which is detected by a photo-interrupter 23, 24 disposed in association with each of the reels 6 and 17. The photointerrupter 23, 24 outputs a pulse each time the light-shielding lug 21, 22 passes therethrough, that is, every one revolution of the associated reel.

On the outer periphery of the first reel 6, there are many kinds of symbols such as "PLUM", "ORANGE" and the like and also a specific symbol formed as a square opening 25 whose size is substantially equal to those of the other symbols. Also the inner reel 17 has many kinds of symbols such as "7", "PLUM", "BAR" and the like which are disposed at regular intervals on the outer periphery of the reel 17. The symbols on the inner reel 17 may, of course, be different in sequence and content from the symbols on the first reel, and the inner reel has no opening like square opening 25. Needless to say, the opening 25 may have another shape or may be covered with a transparent material.

As obvious from Fig. 1, one of the symbols on the inner reel 17 can be observed through the opening 25 of the first reel 6 when the opening 25 stops within the display window 3. More than one opening 25 may be provided, or an opening may extend over two or more symbols on the inner reel 17. In case that the first reel is made of a transparent plastic material whose peripheral surface is wrapped with a light-tight tape having printed symbols thereon, it is possible to form a transparent area in the tape so as to substitute it for the opening 25.

Fig. 4 shows an example of a control circuit for the above described slot machine, in which motor drive circuits 30 and 31 control the start and stop of the rotation of the stepping motors 18 and 19 so as to drive the first and the inner reels 6 and 17, respectively, in an appropriate manner. The rotation of stepping motors 32 and 33 are controlled by motor drive circuits 34 and 35 for driving the second and the third reels 7 and 8, respectively. The second and the third reels 7 and 8 are also formed with light-shielding lug 36 and 37 which are detected by photo-interrupters 38 and 39, respectively, in the same way as the photo-interrupters 23 and 24.

The motor drive circuits 30, 31, 34 and 35 are actuated upon receipt of a pulse signal being generated from a clock pulse generator 40 and being divided in a frequency-divider 41. The pulse signal is supplied to the motor drive circuits 30, 34 and 35 when a change-over switch 42 is in a first switching position as shown by a solid line in Fig. 4, while the pulse signal is supplied to the motor drive circuit 31 when the change-over switch 42 is in a second position shown by a dashed line. The motor drive circuits 30, 31, 34 and 35 control the start and stop of the corresponding stepping motors 18, 19, 32 and 33 according to commands from a controller 45. That is, the motor drive

circuits 30, 31, 34 and 35 supply an individual number of drive pulses to the stepping motors 18, 19, 32 and 33 in a timing of the pulse signal supplied through the change-over switch 42, wherein the number of supplied drive pulses depends on the command signal, and the stepping motors 18, 19, 32 and 33 are driven to rotate by an amount corresponding to the number of supplied drive pulses.

Simultaneously, the drive pulses supplied to the stepping motors 18, 19, 32 and 33 are simultaneously counted by counters 46, 47, 48 and 49, respectively. Each of these counters 46 to 49 is reset to its initial value every time the associated photo-interrupter 23, 24, 38 or 39 detects the corresponding light-shielding lug 21, 22, 36 or 37. The count values of the counters 46 to 49 are fed back to the controller 45. As described above, since the count values of the counter 46, 47, 48, 49 corresponds to the number of drive pulses supplied to the stepping motor 18, 19, 32, 33, it is possible to monitor the rotational position of the stepping motor, that is, the rotational position of each reel 6, 7, 8, 17 based on the count value of the corresponding counter 46, 48, 49, 47. Consequently, the controller 45 can control each motor drive circuit 30, 31, 34, 35 so as to stop each reel at a desirable position based on the monitored count value of the associated counter.

A random number generator 50 outputs a random number within a predetermined range, for example, a range from "0" to "9999", and sends it to a sampling circuit 51. The sampling circuit 51 samples the random number upon receipt of a sampling command from the controller 45. The same random number can not be again sampled until all the other random numbers have been once sampled.

A rank decision circuit 52 decides with reference to a probability table 53 to what rank of winning the sampled random number corresponds. For example, the probability table 53 is constructed as a table memory in which all the random numbers "0" to "9999" to be generated from the random number generator 50 are classified into four ranks, namely, the range from "0" to "199" is assigned to a big hit, the range from "200" to "799" to a middle hit, the range from "800" to "1999" to a small hit, and the range from "2000" to "9999" to a lost game. Depending on which range the sampled random number belongs to, the rank decision circuit 52 outputs a judgment signal representative of one of these winning ranks, that is, a big hit signal, a middle hit signal, a small hit signal or a lost game signal.

In response to the judgment signal from the rank decision circuit 52, a stop symbol determination circuit 54 selects a combination of symbols corresponding to the winning rank indicated by the judgment signal with reference to a symbol ROM 55 and outputs a series of symbol codes, wherein each code represents a symbol to be displayed on each reel. The sym-

bol ROM 55 stores data about symbol code combinations representing possible symbol combinations for each winning rank, so that the kind of symbol is to be stopped on the winning line in each reel is appropriately determined in accordance with the judgment signal from the rank decision circuit 52. It is to be noted that as the slot machine of the present embodiment has actually four reels inclusive of the inner reel 17, the stop symbol determination circuit 54 outputs four kinds of symbol codes, which will be described later in detail. In case that there are several kinds of symbol combinations for the same winning rank, one of those combinations is randomly selected. If the judgment signal indicates the lost game, the stop symbol determination circuit 54 selects at random one of the symbol combinations which are assigned for the lost game.

When the reels 6 to 8 stop, it is determined which symbols are positioned on the winning line 9 in the respective reels 6 to 8. Since the number of drive pulses per rotation of each reel and the number and the sequence of symbols disposed on each reel are constant, it is possible to identify the symbols positioned on the winning line by the count values of the counters 46 to 49. For this purpose, there are provided a first, second and third symbol tables 58 to 60 and an inner reel symbol table 61. These symbol tables 58 to 61 store symbol codes for the individual symbols of the reels 6 to 8 and 17 along with data concerning the position of each symbol as a rotational position of the stepping motor 18, 19, 32 or 33, respectively. Therefore, it can be determined which symbol is positioned on the winning line 9 for each reel based on the count value of each counter, that is, the number of drive pulses supplied to each stepping motor, with reference to each of these symbol tables 58 to 61. The symbol identifying circuit 56 then refers to a coin payout number table 57 so as to supply the controller 45 with data representative of the number of coins to be paid out for the rank of the symbol combination displayed on the winning line.

Individual control signals from the start lever 12, stop buttons 13 to 15, and the additional game start button 16 are inputted through an I/O port 62. A coin sensor 63, upon detecting each insertion of a coin and the number of inserted coins, outputs a signal to the controller 45 through the I/O port 62. A hopper 65 is activated by the controller 45 to pay out an appropriate number of coins when a game results in a hit. A program ROM 66 stores a program for executing a series of game process including the above processing in a predetermined sequence. A RAM 67 is used to write or read necessary data temporarily for executing the game processing.

Now will be described the operation of the above embodiment with reference to the flow chart as shown in Figs. 5 and 6. A regular game is started by actuating the start lever 12 after inserting, for exam-

ple, a single coin. The sampling circuit 51 then samples a random number from the random number generator 50, and the rank decision circuit 52 compares with the probability table 53 so as to decide the rank of winning to be given depending on what range in the table the random number belongs to. For example when the sample random number is "150", the rank decision circuit 52 outputs a big hit signal to the stop symbol determination circuit 54, which then refers to the symbol ROM 55 so as to select one of predetermined symbol combinations representing the big hit. Assuming that the selected combination of symbols consists of "opening", "7", "7" and "7" for the first to third and the inner reels 6, 7, 8 and 17, respectively, the stop symbol determination circuit 54 supplies the corresponding symbol codes to the controller 45.

Meanwhile, upon receipt of a start signal from the start lever 12, the controller 45 sets the change-over switch 42 in the first position shown by the solid line, so that the pulses from the clock pulse generator 40 are, after being divided by the frequency divider 41, supplied to the motor drive circuits 30, 34 and 35. When the stop symbol determination circuit 54 has determined the symbols to be stopped on the effective winning line, that is, the middle horizontal line in this case, the controller 45 outputs an actuating signal to the motor drive circuits 30, 34 and 35.

Upon receipt of the actuating signal, each motor drive circuit 30, 34, 35 starts outputting a number of drive pulses to the stepping motor 18, 32, 33 in accordance with the symbol code supplied through the controller 45, while being supplied with the divided pulse signal from the frequency divider 41. The first to third reels 6 to 8 thus start rotating at once, while the inner reel 17 does not rotate because, at that time, the stepping motor 19 is not supplied with the drive pulses. The present position of the inner reel 17 is registered in the counter 47 as the number of drive pulses counted during the preceding rotation of the inner reel 17.

After a certain time duration from the start of rotation, when the first to third reels 6 to 8 begin to rotate at a constant speed, it becomes possible to actuate the stop buttons 13 to 15. Upon depressing the stop buttons 13 to 15, the controller 45 starts controlling the motor drive circuits 30, 34 and 35 so as to stop the stepping motors 18, 32 and 33 and thus the first to third reels 6 to 8 at such positions that the combination of symbols stopped on the effective winning line corresponds to the selected symbol combination from the stop symbol determination circuit 54, while checking the count values of the counters 46 to 48 with the data stored in the first to third symbol tables 58 to 60. It is to be noted that this stop control will be automatically started unless the player actuates the stop buttons 13 to 15 within a predetermined time duration from the moment at which all the reels 6 to 8 begin to rotate at the constant speed.

As the result of the above described stop control, the stepping motor 18, 32 and 33 stops to stop each of the first to third reels 6 to 8 without remarkable delay from the timing of depression of each stop button 13 to 15. So far as the control have been executed in a proper manner, the symbol combination determined by the stop symbol determination circuit 54, that is, "opening"- "7"- "7" in this case, is displayed on the winning line. When the first to third reels 6 to 8 completely stops, the count values of the counter 46, 48 and 49 are compared with the data in the first to third symbol tables 58 to 61, respectively, so as to confirm whether the predetermined symbol combination is displayed. In addition, because the symbol of the first reel 6 stopping on the winning line is "opening", the present count value of the counter 47 is compared with the data in the inner reel symbol table 61 so as to identify the symbol of the inner reel 17 that can be viewed through the "opening" 25. When, for example, an "ORANGE" is displayed within the opening 25 as shown in Fig. 1, the symbol combination is identified as "ORANGE"- "7"- "7", and thus the regular game is judged as a lost game and no winning is awarded.

25 The reason why the controller 45 identify the displayed symbol combination at the stop of the first to third reels 6 to 8 is that a symbol combination on the winning line might seldom differ from the determined combination if any stop button 13 to 15 should be actuated at a certain timing.

When the "opening" 25 is displayed in the first reel 6 on the effective winning line at the end of the above described regular game, the player can play an additional game.

35 If the player decides to play the additional game, he should depress the additional game start button 16 and insert a coin through the coin slot 10. Unless the additional game button is depressed, the insertion of coin is considered that the next regular game is going to be started.

40 Upon depressing the additional game start button 16, an additional game mode signal is supplied from the I/O port 62 to the controller 45, which then sets the change-over switch to the second position, so that the pulses from the frequency divider 41 are supplied to the motor drive circuit 31 alone. Thereafter when the coin sensor 63 detects the insertion of a coin, the controller 45 supplies an actuating signal to the motor drive circuit 31, thereby driving the stepping motor 19 to rotate the inner reel 17. The other reels 6 to 8 stay in the latest stop positions during the additional game.

45 Simultaneously with the driving of the stepping motor 19, the counter 47 counts the number of drive pulses supplied to the stepping motor 19 for every one rotation thereof. After a certain time duration from the start of rotation, the controller 45 starts the stop control of the inner reel 17. But it may, of course,

be possible to provide a corresponding stop button and start the stop control of the inner reel 17 upon its actuation.

The stop control of the inner reel 17 is carried out while referring to the inner reel symbol table 61 and comparing the count value of the counter 47 therewith in the same way as for the above described stop control of the first to third reels 6 to 8, thereby to stop the symbol to be displayed, for example "7", within the opening 25. As the result, the symbol combination "7"- "7"- "7" is displayed on the winning line 9 in the display windows 3 to 5.

At the end of the additional game, the symbol identifying circuit 56 also identifies the symbols displayed on the winning line and refers to the pay out number table 57 so as to decide the number of coins to be paid out for the symbol combination. When the symbol combination is identified as "7"- "7"- "7", the controller 45 is allowed to output a coin pay-out signal to the hopper 65, which then pays out the corresponding number of coins.

In case that more than one winning line is effective, and if the opening 25 stops on one of these winning lines and, at the same time, a hit (or winning) symbol combination is displayed on another effective winning line at the end of a regular game, the player can play an additional game after being awarded the prize for the hit obtained in the regular game. Needless to say, the player can not play an additional game when the opening 25 stops within the display window 3 but not on the effective winning line or lines.

The slot machine according to the above embodiment, which is apparently a kind of three-reel type slot machine, functions as a four-reel type slot machine and therefore can display a wider variety of symbol combinations than a conventional three-reel type slot machine. Besides the double reel assembly 20 comprising the first reel 6 with the single opening 25 and the inner reel 17, it is possible to form at least one opening and to provide a corresponding inner reel for each of the first to the third reels. Furthermore, it is possible to start rotating the inner reel 17 simultaneously with the start of rotation of the other reels 6 to 8, so as to display moving symbols of the inner reel 17 in the opening 25 when the opening stops within the display window 3 and then to stop one of these symbols in the opening 25 after an appropriate time delay from the stop of the first reel 6. It is also possible to rotate the first reel 6 as well as the inner reel 17 in the additional game, so that not only the symbols on the inner reel 17 viewed through the opening 25 but also the symbol to be displayed on the winning line for the additional game.

In order to apply the present invention to a video-type slot machine, it has only to set a data for displaying such a specific symbol as having the similar function to the opening 25, for example a blank, within graphic data which are stored in a ROM in accordance

with the sequence of displaying graphic symbols, and when the "blank" stops on any one of the effective winning line, a series of moving symbols can be displayed in the blank in accordance with another graphic data stored in another ROM, so that one of these symbols stops in the blank position at the end of the additional game.

Fig. 7 shows a reel 71 according to a further embodiment of the present invention, which can be submitted for the double reel assembly 20 as shown in Fig. 1. The reel 71 which is driven by a stepping motor 70 has a series of symbols arranged at regular intervals on the outer periphery of the reel 71. Of these symbols, there is provided an opening 72 that is about as large as the other symbols. The reel 71 is integrally formed with a light-shielding lug 71a, which is detected by a photointerrupter 73 upon passing therethrough. On the inner surface of the reel 71, there are mounted a liquid crystal display panel 75, the display surface of which is exposed through the opening 72. Further, a drive unit 76 including a battery and a memory storing display pattern data, and an optical signal receiver 77 are provided on the inner surface of the reel 71.

A display data transmitter 78 energizes either or both of LEDs 79a and 79b intermittently to emit light so as to generate an optical signal defined by the number and the cycle of the wink (on-off) of the LEDs. The optical signal is transmitted through optical fibers 80a, 80b and 80c, wherein the outlets of the optical fibers 80a, 80b and 80c are so positioned that one of the three outlets faces to the optical signal receiver 77 when the opening 72 stops on any one of three winning lines as shown in Fig. 3. If the middle horizontal winning line alone is effective, and if the opening 72 of the reel 71 stops on the middle line, only the LED 79a is energized to flash on and off. The optical signal receiver 77, upon receipt of the optical signal from the LED 79a, drives the liquid crystal display panel 75 to display a symbol corresponding to the optical signal by means of the drive unit 76. If more than one winning line is effective, also the LED 79b is energized, so that the liquid crystal panel 75 stopping on any one of the effective lines displays a corresponding symbol.

In the same manner as the first embodiment, the player can decide to play an additional game if the opening 72 stops on any one of the effective lines at the end of a regular game. When the player starts to play the additional game, the display data transmitter 78 is actuated for a predetermined time period to send to the optical signal receiver 77 an optical signal which differs from the optical signal sent in the regular game. As the result, a variety of symbols are sequentially displayed on the liquid crystal panel 75 as if the symbols were moving behind the opening 72. By controlling the display date transmitter 78 in accordance with the decision of the stop symbol deter-

mination circuit 54, the same stop control as the first embodiment can be performed. It may be possible to use a stationary liquid crystal display panel having a display segment for each winning line in association with a reel having at least a transparent portion.

Fig. 8 shows a triple reel assembly according to the third embodiment of the present invention, wherein the triple reel assembly alone is mounted in a slot machine. The first to third reels 81 to 83 of the triple reel assembly are rotatably mounted on a common shaft 84 and are respectively driven by stepping motors 88 to 90 by way of timing belts 85 to 87. The first reel 81 is formed with eight openings 81a, and the second reel 82 is formed with four openings 82a, while the third reel 83 has no opening but has a plurality of symbols on its outer periphery. The first and the second reels 81 and 82 have no symbol in the surface areas among the openings. In this embodiment, a front panel 91 is formed with a display window 92.

The first to third reels 81 to 83 are driven to rotate by stepping motors 88 to 90, respectively. Thereafter when all the reels stop, if any symbol on the third reel 83 can be seen through the display window 92 and the openings 81a and 82a, a prize is awarded for the hit corresponding to the winning rank of the symbol.

It is, of course, possible to provide three winning lines in this embodiment. It is also possible to provide several symbols among the openings 81a and 82a of the first and the second reels 81 and 82 so that the symbols on the first to the third reels are taken into account for the winning judgment. It may be possible to arrange a number of such triple reel assemblies side by side.

Although the above description substantially relates to the embodiments shown in the drawings, the present invention should not be limited to these embodiments. It is therefore to be understood that within the scope of the appended claims the invention may be practiced or embodied in still other way. For example, the reels of a multiple reel assembly need not always be rotated in coaxial. The drive control of the stepping motors for rotating and stopping the reels is not necessary executed by means of the circuit as shown in Fig. 4, but other various circuits may be used for this purpose. Furthermore, the present invention may be adapted to such a game machine in which each rotating reel is mechanically stopped by an arresting hook. For driving the reels of a multiple reel assembly, it may be possible to use a single motor together with a clutch mechanism and selectively to drive necessary reel or reels through the clutch mechanism. It may further be possible to combine the multiple reel assembly of the invention with a pin ball machine. The additional game button may be omitted such that the inner reel is automatically rotated when the opening stops on the winning line.

Claims

1. A game machine comprising:
5 a first and a second series of symbols (6,17), each series comprising a plurality of symbols;
10 first display control means for displaying the first series of symbols (6) in motion for a period of time and thereafter at least one symbol of the first series (6) stationary; characterized by
15 second display control means for displaying the second series of symbols (17) in motion in place of a symbol of the first symbol series (6) and thereafter displaying a symbol of the second series (17) stationary to replace that symbol of the first series.
2. A game machine according to claim 1, wherein a plurality of symbol columns (6,7,8) are provided, of which at least one symbol column (6) contains the first symbol series and the second symbol series (17) overlapping each other.
3. A game machine according to claim 2, wherein 20 said second display control means are activated when a specific symbol stops on the winning line in any of said columns and wherein the second series of symbols are movingly displayed in the position of said specific symbol while the other symbols are kept unchanged, whereby an additional game is effected.
4. A game machine according to claim 1, wherein 25 the symbol of the first series which is replaced is a blank.
5. A game machine according to claim 4, wherein 30 said blank is formed as a liquid crystal display panel (72) driven by a drive unit (75) to display the second series of symbols.
6. A game machine according to claim 5, wherein 35 said drive unit is controlled by a display data transmitter (78) for outputting optical signals representative of symbols to be displayed on said display panel.
7. A game machine as defined in claim 6, wherein 40 said optical signals are transmitted through optical fibers (80a,80b,80c).
8. A game machine according to claim 1, wherein 45 the symbols are displayed on a CRT screen.
9. A game machine according to any one of the preceding claims, further comprising a manually actuatable button for selecting the activation of 50 said second display control means when said

symbol of the first symbol series to be replaced stops within said display window.

10. A game machine according to Claim 1 comprising:

a rotational inner reel (17,83) having said first plurality of symbols arranged circumferentially around its outer periphery;

an outer reel (6,81) rotatable around said inner reel and having said second plurality of symbols and at least one transparent portion (25) arranged circumferentially around its outer periphery, said transparent portion (25) being at least as large as a symbol; and

reel control means (20,21) for controlling the start and stop of the rotation of said inner and outer reels (6,17,81,83) independently of each other and for controlling the outer reel to stop with its transparent portion overlying a symbol on the inner reel.

11. A game machine according to claim 10, wherein said transparent portion (25) is an opening in the reel periphery.

12. A game machine as defined in claim 10 or 11, wherein each of said inner and outer reels (6,17,81,83) is independently driven by a stepping motor (18,19).

13. A game machine according to claim 10, 11 or 12 comprising a further reel (82) disposed coaxially with said inner and outer reels (6,17,81,83).

14. A game machine according to claim 12 or 13, wherein said reels are rotatably mounted on a shaft (84), each of which is connected with said stepping motor (18,19,88,89,90) through a transmission means (85,86,87).

15. A game machine according to claim 14, wherein said transmission means (85,86,87) is a toothed belt.

Patentansprüche

1. Spielgerät, das umfaßt:

- eine erste sowie eine zweite Folge (6, 17) von Symbolen, wobei jede Folge eine Mehrzahl von Symbolen enthält;
- eine erste Anzeigesteuereinrichtung, um die erste Folge (6) von Symbolen in Bewegung für eine Zeitspanne und danach wenigstens ein Symbol der ersten Folge (6) stationär darzustellen; gekennzeichnet durch
- eine zweite Anzeigesteuereinrichtung, um

5 die zweite Folge (17) von Symbolen in Bewegung an Stelle eines Symbols der ersten Symbolfolge (6) darzustellen und danach ein Symbol der zweiten Folge (17) stationär, um jenes Symbol der ersten Folge zu ersetzen, wiederzugeben.

10 2. Spielgerät nach Anspruch 1, dadurch gekennzeichnet, daß eine Mehrzahl von Symbolspalten (6, 7, 8) vorhanden ist, von denen wenigstens eine Symbolspalte (6) die erste Symbolfolge und die zweite Symbolfolge (17), die sich einander überdecken, enthält.

15 3. Spielgerät nach Anspruch 2, dadurch gekennzeichnet, daß die genannte zweite Anzeigesteuereinrichtung aktiviert wird, wenn ein spezielles Symbol auf der Gewinnlinie in irgendeiner der besagten Spalten anhält, und daß die zweite Folge von Symbolen sich bewegend in der Position des erwähnten speziellen Symbols dargestellt wird, während die anderen Symbole unverändert gehalten werden, wodurch ein zusätzliches Spiel bewirkt wird.

20 4. Spielgerät nach Anspruch 1, dadurch gekennzeichnet, daß das Symbol der ersten Folge, das ersetzt wird, eine Leerstelle ist.

25 5. Spielgerät nach Anspruch 4, dadurch gekennzeichnet, daß die besagte Leerstelle als ein von einer Treibereinheit (76) betriebenes Flüssigkristall-Anzeigefeld (75), um die zweite Folge von Symbolen darzustellen, ausgebildet ist.

30 6. Spielgerät nach Anspruch 5, dadurch gekennzeichnet, daß die genannte Treibereinheit von einem Anzeigedatensender (78) gesteuert wird, um optische Signale auszugeben, die für an dem besagten Anzeigefeld darzustellende Symbole repräsentativ sind.

35 7. Spielgerät nach Anspruch 6, dadurch gekennzeichnet, daß die genannten optischen Signale durch optische Fasern (80a, 80b, 80c) übertragen werden.

40 8. Spielgerät nach Anspruch 1, dadurch gekennzeichnet, daß die Symbole an einem Schirm einer Kathodenstrahlröhre dargestellt werden.

45 9. Spielgerät nach irgendeinem der vorhergehenden Ansprüche, das ferner eine manuell betätigebare Taste zur Wahl der Aktivierung der genannten zweiten Anzeigesteuereinrichtung, wenn das besagte Symbol der ersten Symbolfolge, das zu ersetzen ist, innerhalb des erwähnten Sichtfesters anhält, umfaßt.

10. Spielgerät nach Anspruch 1, das umfaßt:

- eine innere Rotationstrommel (17, 83), die die besagte erste Mehrzahl von Symbolen, welche in Umfangsrichtung um ihren Außenumfang herum angeordnet sind, besitzt;
- eine äußere Trommel (6, 81), die um die genannte innere Trommel herum drehbar ist und die besagte zweite Mehrzahl von Symbolen sowie wenigstens ein durchsichtiges Teil (25), welche in Umfangsrichtung um ihren Außenumfang herum angeordnet sind, wobei das erwähnte durchsichtige Teil (25) wenigstens so groß wie ein Symbol ist, besitzt; und
- Trommelsteuereinrichtungen (20, 21), um das Starten sowie Stoppen der Drehbewegung der besagten ersten sowie zweiten Trommeln (6, 17, 81, 83) unabhängig voneinander zu steuern und um die äußere Trommel für ein Stoppen zu steuern, wobei ihr durchsichtiges Teil über einem Symbol an der inneren Trommel liegt.

11. Spielgerät nach Anspruch 10, dadurch gekennzeichnet, daß das genannte durchsichtige Teil (25) eine Öffnung im Trommelumfang ist.**12. Spielgerät nach Anspruch 10 oder 11, dadurch gekennzeichnet, daß jede der besagten inneren und äußeren Trommeln (6, 17, 81, 83) unabhängig durch einen Schrittmotor (18, 19) angetrieben wird.****13. Spielgerät nach Anspruch 10, 11 oder 12, das eine weitere, koaxial mit den besagten inneren und äußeren Trommeln (6, 17, 81, 83) angeordnete Trommel (82) umfaßt.****14. Spielgerät nach Anspruch 12 oder 13, dadurch gekennzeichnet, daß die besagten Trommeln auf einer Welle (84) montiert sind, wobei jede von diesen über eine Übertragungseinrichtung (85, 86, 87) mit dem genannten Schrittmotor (18, 19, 88, 89, 90) verbunden ist.****15. Spielgerät nach Anspruch 14, dadurch gekennzeichnet, daß die Übertragungseinrichtung (85, 86, 87) ein Zahnriemen ist.****Revendications****1. Machine de jeu comprenant :**

une première série de symboles (6) et une deuxième série de symboles (17) comprenant chacune une multiplicité de symboles; des premiers moyens de commande d'affichage

pour afficher la première série de symboles (6) en mouvement pendant un laps de temps et ensuite au moins un symbole de la première série (6) stationnaire; caractérisée par des deuxièmes moyens de commande d'affichage pour afficher la deuxième série de symboles (17) en mouvement à la place d'un symbole de la première série de symboles (6) et pour afficher ensuite un symbole de la deuxième série (17) stationnaire pour remplacer ce symbole de la première série.

2. Machine de jeu selon la revendication 1, dans laquelle il est prévu une multiplicité de colonnes de symboles (6, 7, 8), dont au moins une colonne de symboles (6) contient la première série de symboles et la deuxième série de symboles (17) se recouvrant l'une l'autre.

3. Machine de jeu selon la revendication 2, dans laquelle les deuxièmes moyens de commande d'affichage sont actionnés lorsqu'un symbole spécifique s'arrête sur la ligne de gain dans l'une quelconque desdites colonnes et dans laquelle la deuxième série de symboles est affichée en mouvement dans la position dudit symbole spécifique tandis que les autres symboles sont maintenus inchangés, d'où il résulte qu'on joue une partie supplémentaire.

4. Machine de jeu selon la revendication 1, dans laquelle le symbole de la première série qui est remplacé est un blanc.

5. Machine de jeu selon la revendication 4, dans laquelle le blanc est formé sous forme d'un panneau d'affichage à cristaux liquides (72) activé par une unité d'entraînement (75) pour afficher la deuxième série de symboles.

6. Machine de jeu selon la revendication 5, dans laquelle l'unité d'entraînement est commandée par un émetteur de données d'affichage (78) pour envoyer des signaux optiques représentatifs de symboles à afficher sur ledit panneau d'affichage.

7. Machine de jeu selon la revendication 6, dans laquelle les signaux optiques sont transmis par l'intermédiaire de fibres optiques (80a, 80b, 80c).

8. Machine de jeu selon la revendication 1, dans laquelle les symboles sont affichés sur un écran de tube à rayons cathodiques.

9. Machine de jeu selon l'une quelconque des revendications précédentes, comprenant en outre un bouton pouvant être actionné manuellement

pour sélectionner l'activation des deuxièmes moyens de commande d'affichage lorsque ledit symbole de la première série de symboles à remplacer s'arrête à l'intérieur de la fenêtre d'affichage.

5

10. Machine de jeu selon la revendication 1, comprenant :
 un tambour intérieur tournant (17, 83) portant la première multiplicité de symboles disposés circonférentiellement autour de sa périphérie extérieure;
 un tambour extérieur (6, 81) pouvant tourner autour du tambour intérieur et ayant la deuxième multiplicité de symboles et au moins une portion transparente (25) disposée circonférentiellement autour de sa périphérie extérieure, cette portion transparente (25) étant au moins aussi large qu'un symbole; et
 des moyens de commande des tambours (20, 21) pour commander le départ et l'arrêt de la rotation des tambours intérieur et extérieur (6, 17, 81, 83) indépendamment l'un de l'autre et pour commander l'arrêt du tambour extérieur avec sa portion transparente recouvrant un symbole sur le tambour intérieur.

11. Machine de jeu selon la revendication 10, dans laquelle cette portion transparente (25) est une ouverture dans la périphérie du tambour. 30

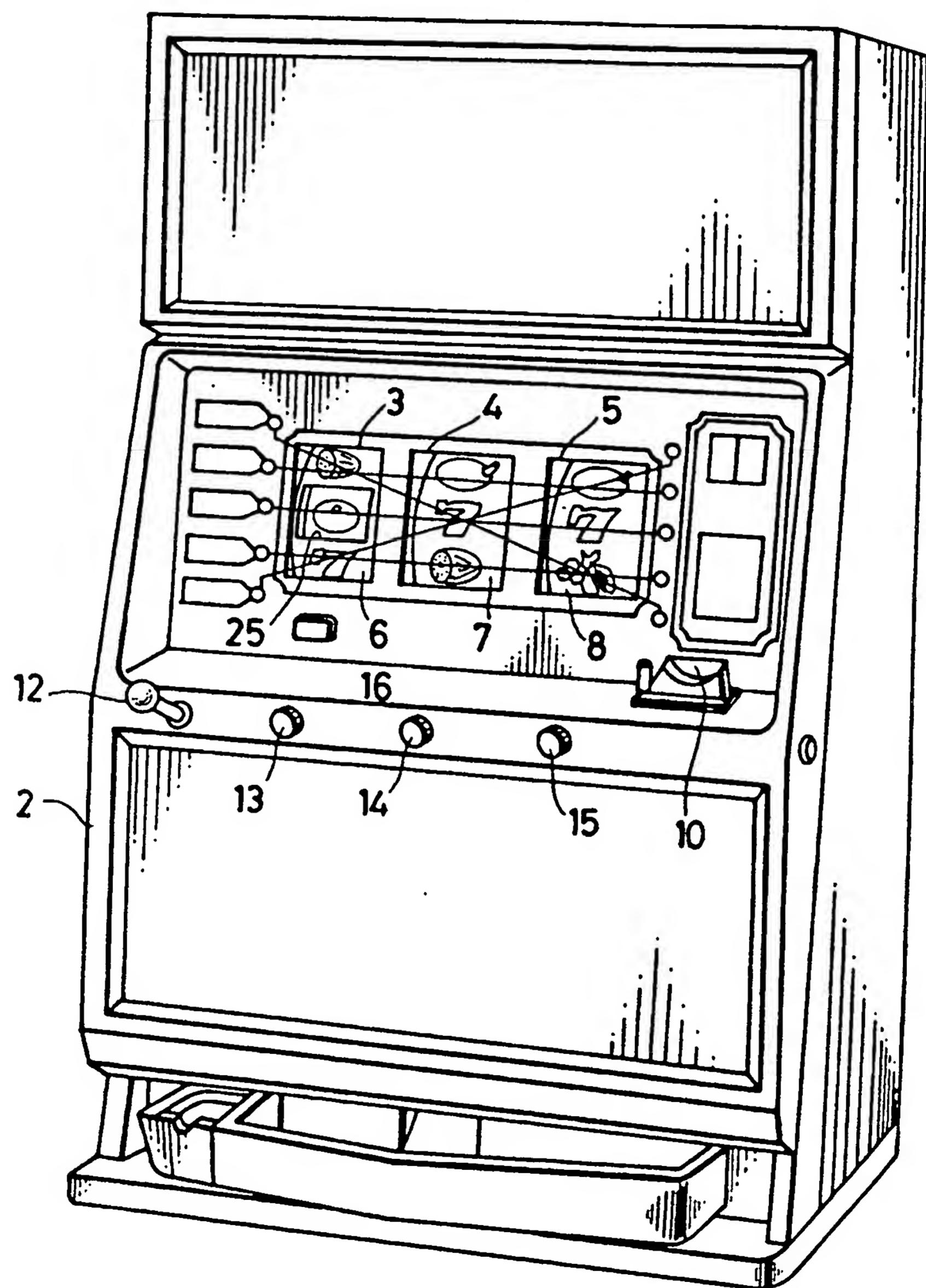
12. Machine de jeu selon la revendication 10 ou la revendication 11, dans laquelle chacun des tambours intérieur et extérieur (6, 17, 81, 83) est entraîné indépendamment par un moteur pas à pas (18, 19). 35

13. Machine de jeu selon l'une des revendications 10, 11 ou 12, comprenant un autre tambour (82) disposé coaxialement avec les tambours intérieur et extérieur (6, 17, 81, 83). 40

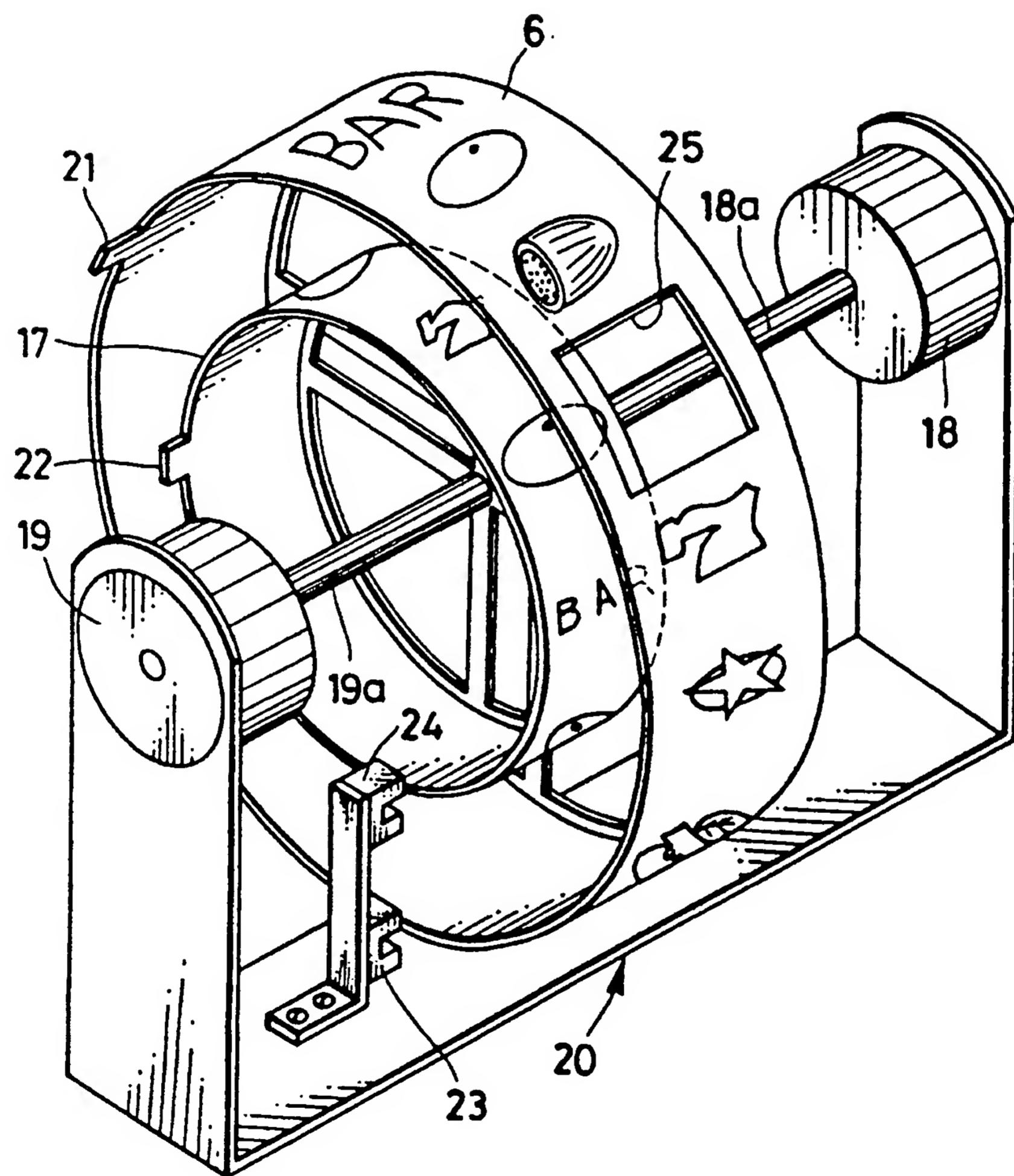
14. Machine de jeu selon la revendication 12 ou la revendication 13, dans laquelle les tambours sont montés à rotation sur un arbre (84), chacun de ces tambours étant raccordé au moteur pas à pas (18, 19, 88, 89, 90) par l'intermédiaire d'un moyen de transmission (85, 86, 87). 45

15. Machine de jeu selon la revendication 14, dans laquelle ce moyen de transmission (85, 86, 87) est une courroie crantée. 50

F I G . 1



F I G . 2



F I G . 3

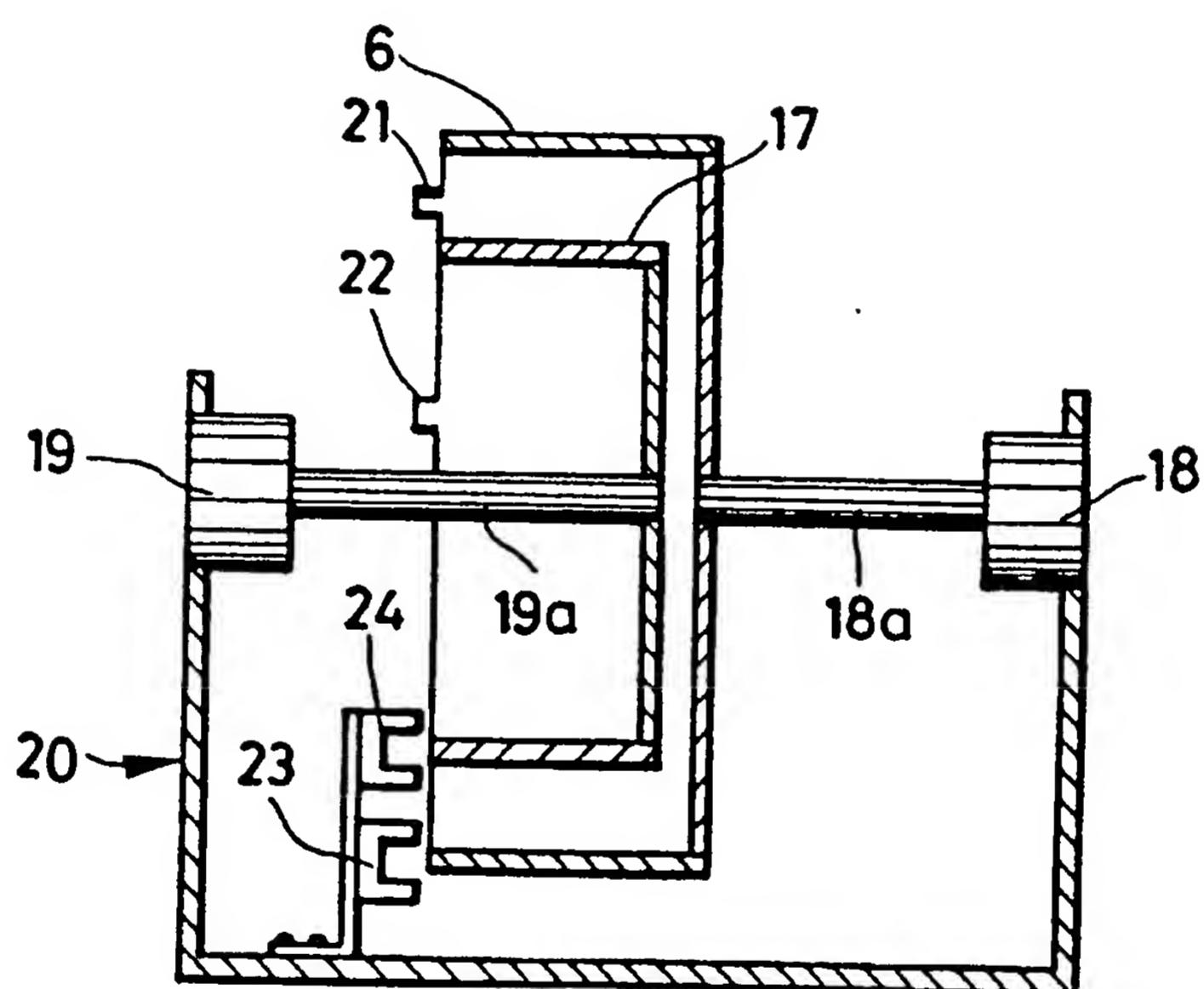
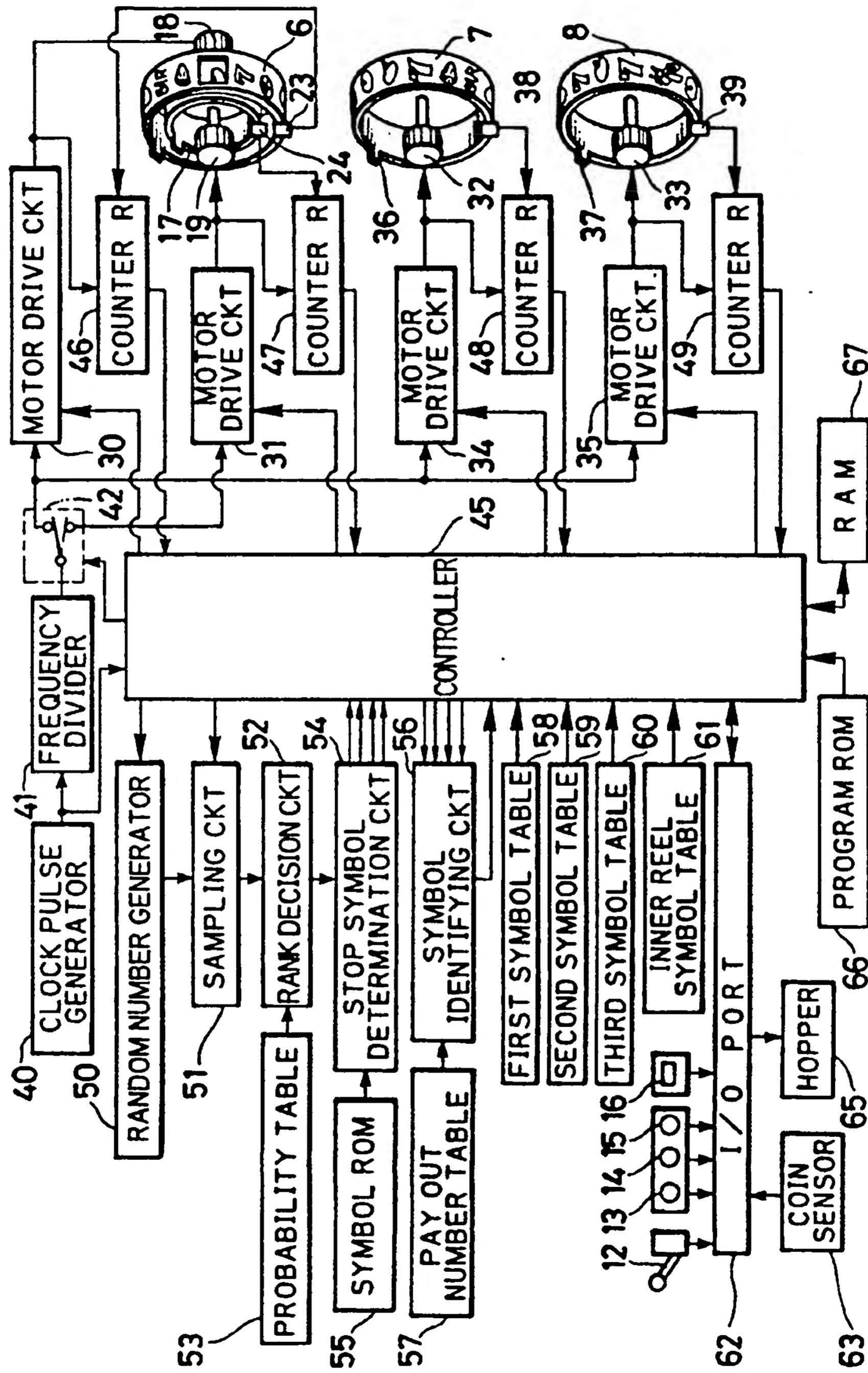


FIG. 4



F I G . 5

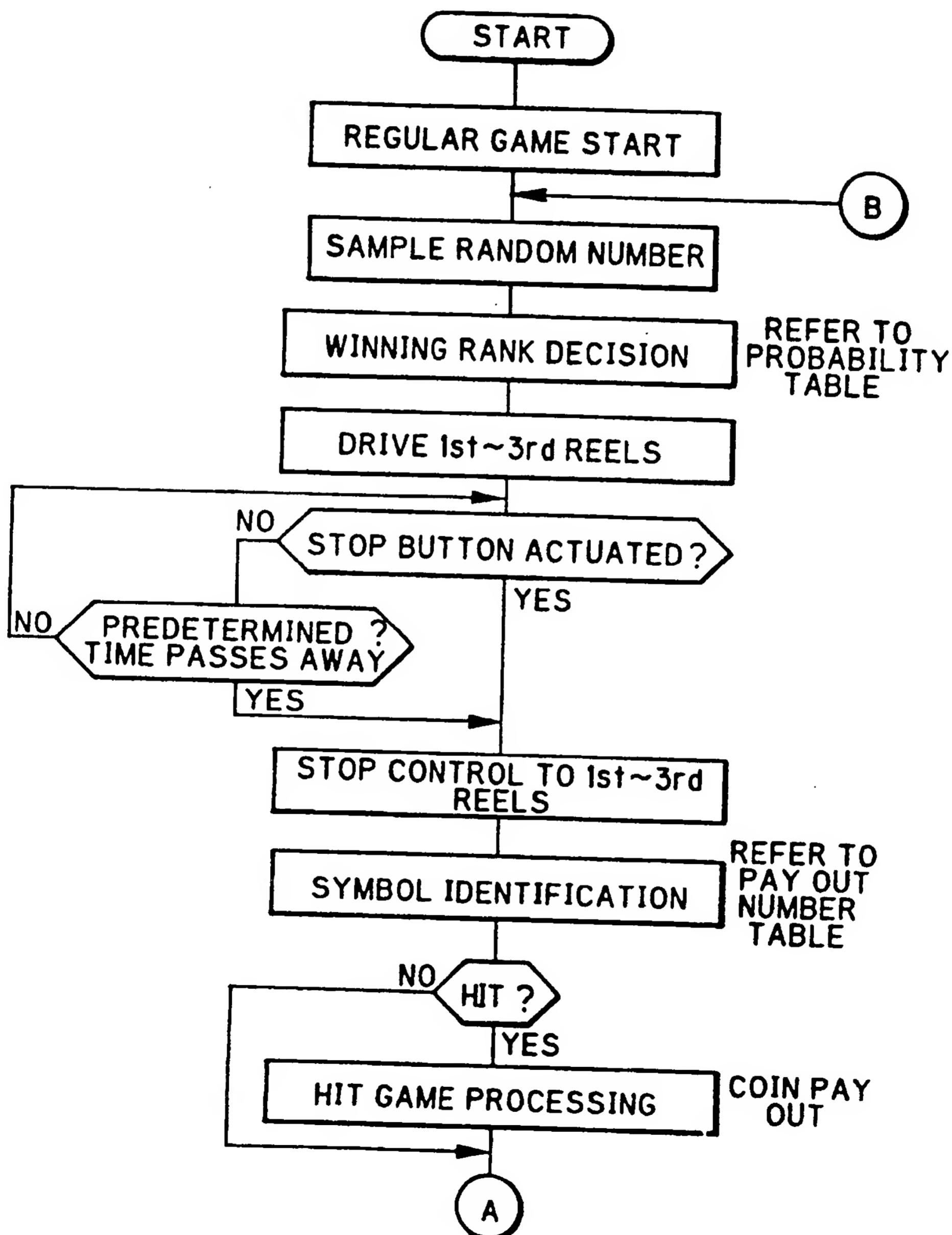
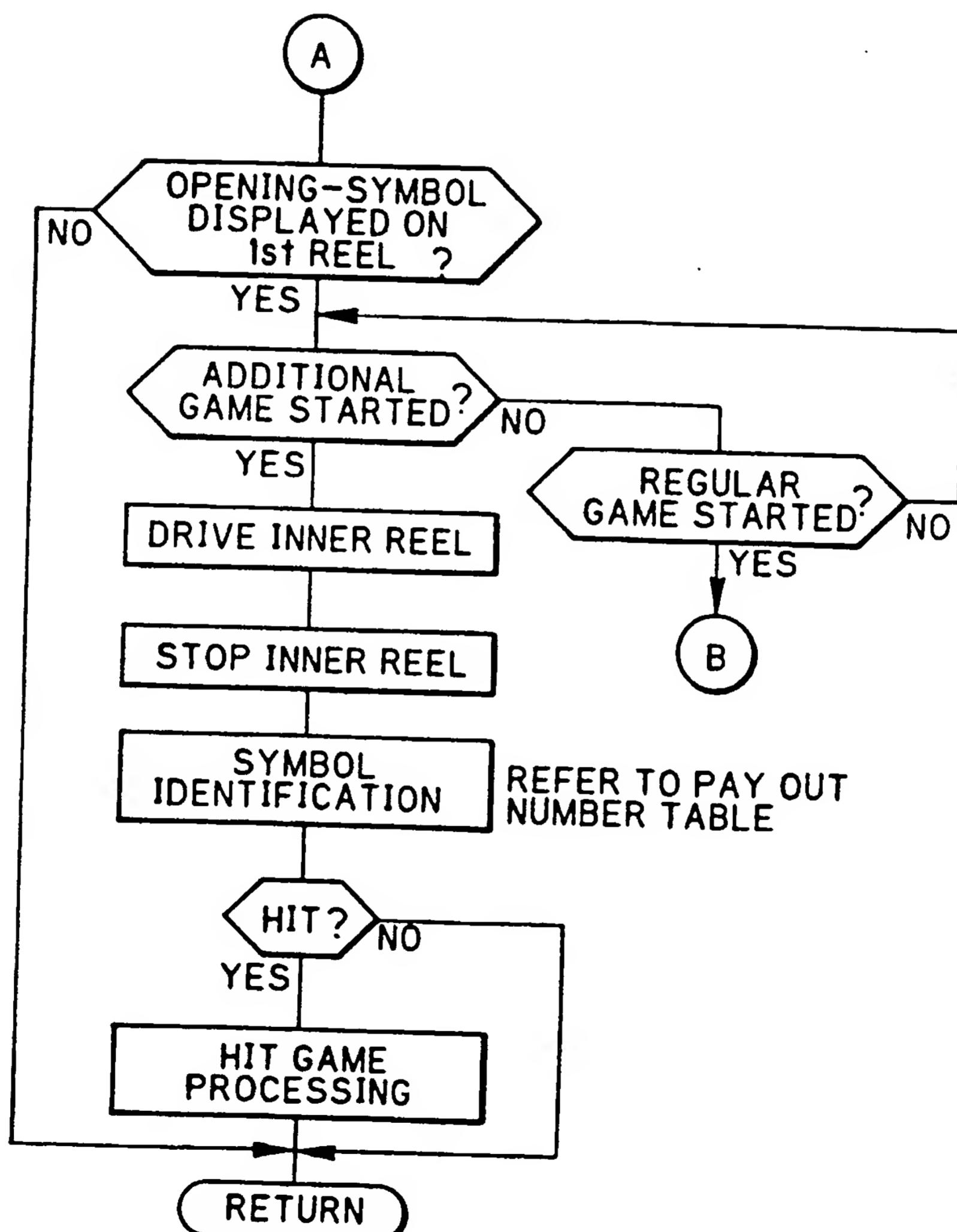
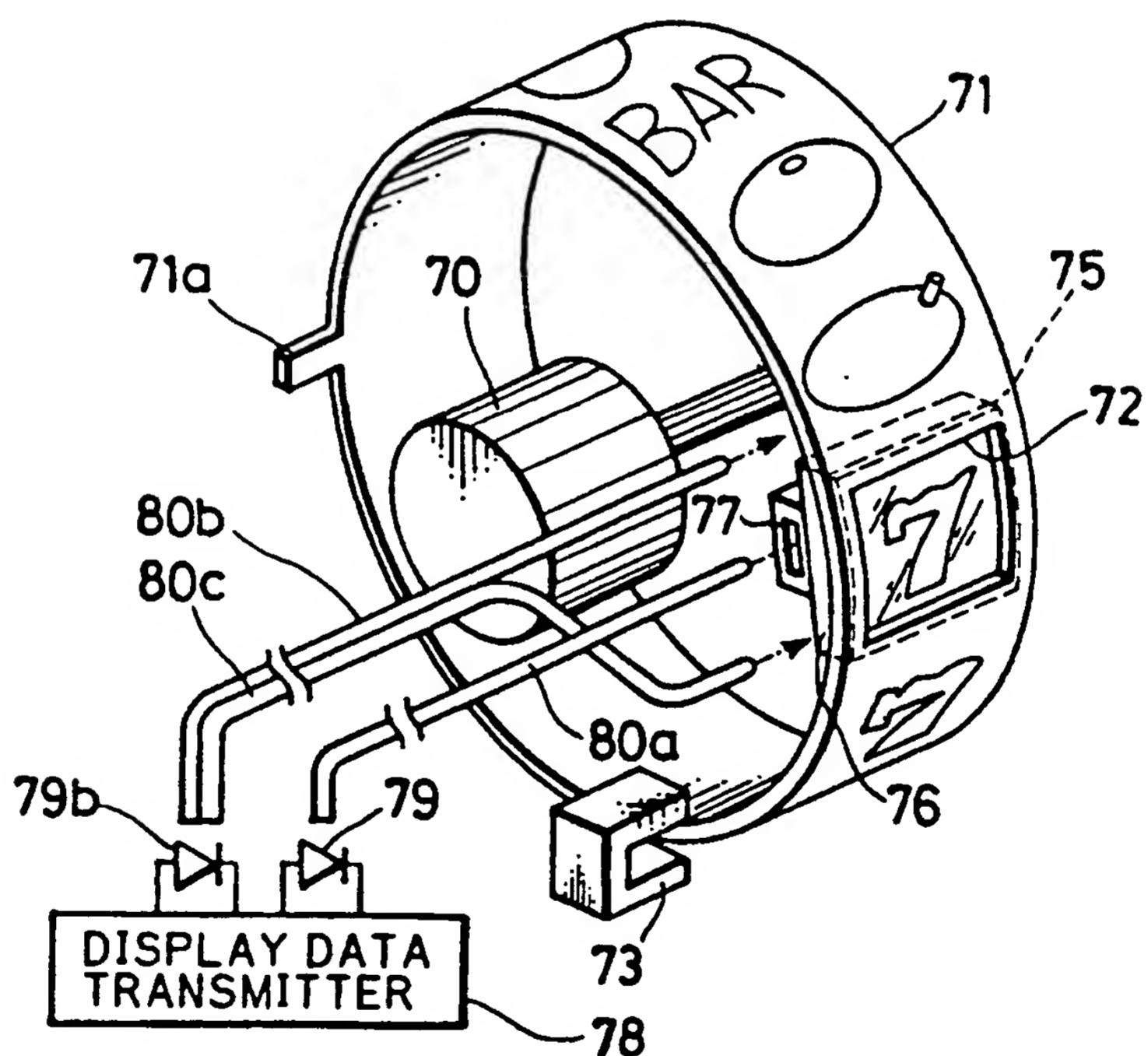


FIG. 6



F I G. 7



F I G . 8

